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|--|-------------|----------------------|---------------------|------------------|
| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/823,355   | 04/12/2004  | Robert Martinson     | NVLS002898          | 4719             |
| 91286  | 7590        | 02/16/2011           |                     |                  |
| Harness, Dickey & Pierce, P.L.C.<br>P.O. Box 828<br>Bloomfield Hills, MI 48303 |             |                      | EXAMINER            |                  |
|  |             |                      | BAND, MICHAEL A     |                  |
| ART UNIT   |             | PAPER NUMBER         |                     |                  |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |
|------------------------------|--------------------------------------|---|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/823,355 | <b>Applicant(s)</b><br>MARTINSON ET AL. |
|                              | <b>Examiner</b><br>MICHAEL BAND      | <b>Art Unit</b><br>1723                 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 31 January 2011.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 38-47 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 38-47 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 19 July 2010 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No.(s)/Mail Date _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTC-412)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the pedestal shield comprising a first portion, a first arcuate portion having a first end, a second end, a concave side, a convex side, a sidewall shield comprising a second portion, a second arcuate portion, a first end, a second end, a concave side, a convex side, the second portion of the sidewall shield including a first subportion extending horizontally inward of the chamber, a second subportion extending vertically downward from said first subportion, and a third subportion extending horizontally inward from said second subportion , wherein the second arcuate portion extends from said third subportion must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

2. Claims 38-47 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 38, 40, and 43-44 require when the sputter target and the pedestal are moved to the processing or loading position. There is no support in the Specification for both the pedestal and the sputter target to be moved to the processing or loading position (emphasis added). Claim 41 requires second portion of the sidewall shield including a first subportion extending horizontally inward of the chamber, a second subportion extending vertically downward from said first subportion, and a third subportion extending horizontally inward from said second subportion , wherein the second arcuate portion extends from said third subportion. There is no support in the Specification or Drawings for this claim requirement. Claims 39-40 require the arcuate portions to be 'C'-shaped and approximately the same size

with the second end of the arcuate portion to be spaced approximately evenly from the first and second ends of the other arcuate portion, with claim 41 requiring second portion of the sidewall shield including a first subportion extending horizontally inward of the chamber, a second subportion extending vertically downward from said first subportion, and a third subportion extending horizontally inward from said second subportion , wherein the second arcuate portion extends from said third subportion. There is no support in the Specification or Drawings for how the claim requirements of claims 39-40 can be implemented with claim 41.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 38-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al (US Patent No. 5,589,224; i.e. Ref1) in view of Tepman et al (US Patent No. 5,803,977; i.e. Ref2) and Chung et al (US Patent No. 6,171,453).

With respect to claims 38-40 and 43, Ref1 discloses an apparatus for full wafer deposition with a shield arrangement that prevents deposition in the area of a chamber surrounding a substrate (i.e. wafer) (abstract), where fig. 5 depicts a sputtering target [70] facing a pedestal [80] that is moved from a loading (i.e. lowered) position and a raised (i.e. processing) position. The pedestal [80] has a bump (i.e. representative of top

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surface plane) [34] where a pedestal shield extends from said bump [34], where a first portion extends a first distance from said bump [34] away from said pedestal [80] to a first arcuate portion having a first end, a second end, a concave side opening vertically towards a top of the chamber, and a convex side, where said first end extends from said first portion with said pedestal shield residing below a top surface plane of said pedestal [80]. The cropped figure below of fig. 5 serves to further clarify the pedestal and pedestal shield.

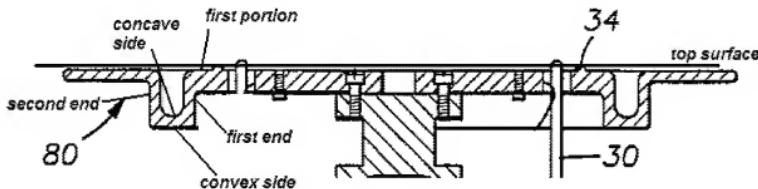
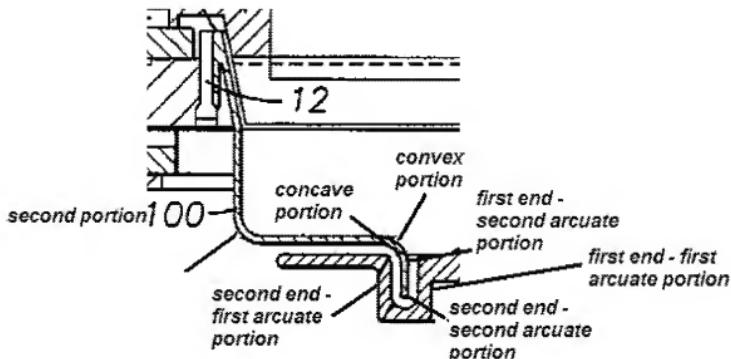


Fig. 5 further depicts a sidewall shield [60] comprising a second portion [100] extending downward from an upper portion of the chamber, and a second arcuate portion having a first end, a second end a concave side, and a convex side. Fig. 5 also depicts the concave side partially opening vertically towards a bottom of the chamber, where when the pedestal is raised into the processing position via lifter [90], the second end of the first arcuate portion is positioned vertically above and between the first and second ends of the second arcuate portion and the second end of the second arcuate portion is positioned vertically below and between the first and second ends of the first arcuate portion. Fig. 5 also depicts the second end of the first arcuate portion spaced approximately even between the first end and second end of the second arcuate

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portion, and the second end of the second arcuate portion is spaced approximately even between the first end and the second end of the first arcuate portion. The cropped figure below of fig. 5 serves to further clarify the sidewall shield.



Despite Ref1 not teaching the shield system having the second arcuate portion with a fully convex and concave portion, the pedestal shield having the first arcuate portion with a fully convex portion, and the second portion of the sidewall shield extending just below the second end of the pedestal shield, it has been held the configuration of the claimed shields is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed shields is significant, with it also being held that where the only difference between the prior art and the claimed was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. See MPEP 2144.04, Section IV, Parts A and B. Since Applicant

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states that having the first and second arcuate portions being 'C'-shaped and approximately the same size to cooperatively prevent line-of-sight or gas-scattered transmission deposition (see Applicant's Specification, para 0012-0013) in addition to Applicant's Figures 5-14 depicting alternative embodiments of different shapes and dimensions that also cooperate to prevent line-of-sight or gas-scattered transmission deposition, and since Ref1 teaches that the sidewall shield and pedestal shield cooperate when the pedestal is in the raised position to avoid contact with each other and prevent line of sight deposition from the sputter target [70] to the side and lower walls of the chamber (col. 5, lines 50-67; col. 6, lines 1-15), the changing of the shape and proportions of the pedestal and sidewall shields of Ref1 to the claimed shape and proportions of the pedestal and sidewall shields would be obvious to one of ordinary skill in the art since the claimed device does not perform differently. However Ref1 is limited in that it is unclear as to whether the bump, and thus the top plane, is part of the pedestal or the pedestal shield.

Ref2 teaches a removable deposition shield assembly for a sputtering chamber (abstract), where figs. 1-2 depict a substrate [14] on a pedestal [16] having bumps [35] with a top plane, a cylindrical shield [10], and a shield ring (i.e. pedestal shield) [20], where figs. 5-6 alternatively depict said bumps may or may not be part of a deposition ring (i.e. pedestal shield) instead of said pedestal. Ref2 teaches that both locations of the bumps function identically to precisely center the substrate (col. 3, lines 63-67; col. 4, line 1; col. 6, lines 11-13; col. 7, lines 46-51).

Since Ref2 recognizes the equivalency of forming the bumps as part of the pedestal or pedestal shield to center the substrate, it would have been obvious to one of ordinary skill in the art to form the bumps of Ref1 as part of the pedestal taught by Ref2 as it is merely the selection of functionally equivalent bump locations recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so. It further would have been obvious that since both Ref1 and Ref2 teach bump locations for centering the substrate, one of ordinary skill would substitute one bump location (i.e. pedestal shield) for another (i.e. pedestal) to attain the predictable result of centering the substrate. It further would have been obvious to one of ordinary skill in the art to try using the bump location on the pedestal of Ref2 in attempt to improve the centering of the substrate of Ref1, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp since the bump is located on either the pedestal or pedestal shield.

However modified Ref1 is further limited in that while it is suggested to configure a removably attachable pedestal, the pedestal shield being removably attachable to the pedestal is not suggested.

Chung et al further teaches a sidewall shield [48] used for physical vapor deposition with a pedestal [82] having a pedestal shield [84] capable of moving up and down inside a deposition chamber [80] (abstract; figs. 6A-6B). Figs. 6A-6B depict the sidewall shield [48] having an extension to a lower end that extends below the pedestal [82] and forms a bottom wall shield (i.e. inward portion) that extends along a lower wall of the deposition chamber [80], with said bottom wall shield extending upward with a

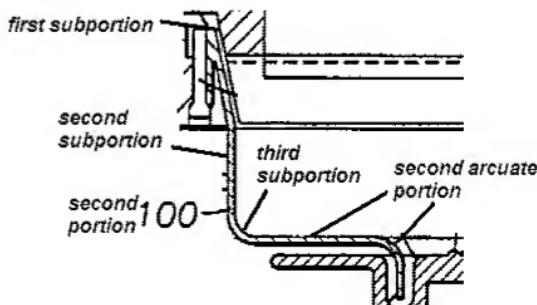
lower portion of the pedestal shield [84] between said extension and said bottom wall shield. Chung et al also teaches the pedestal shield [84] being attachable to the pedestal [82] (col. 6, lines 59-64).

It would have been obvious to one of ordinary skill in the art to substitute the two-piece pedestal shield and pedestal as taught by Chung et al in place the single-piece pedestal shield and pedestal of modified Ref1 to attain the predictable result of blocking line-of-sight to prevent deposition particles from depositing on the chamber sidewalls and bottom. It further would have been obvious to one of ordinary skill in the art to have the pedestal shield attachable (i.e. removable) to the pedestal since it has been held that if it were desirable for any reason to obtain access to the pedestal, it would be obvious to make the pedestal shield removable for that purpose. See MPEP 2144.04, Section V, Part C. In this case, it is desirable to remove only the pedestal shield in order to replace or clean said pedestal shield due to deposited material while leaving the pedestal in place, thus it is obvious to make said pedestal shield removable. It further would have been obvious to one of ordinary skill in the art to use the two-piece pedestal shield and pedestal taught by Chung et al to prevent deposition particles from depositing on the chamber sidewalls and bottom as taught by modified Ref1 since using a known technique of pedestal shields for preventing deposition material accumulating on the chamber sidewalls and bottom is desired in modified Ref1. It further would have been obvious to one of ordinary skill in the art to try using the two-piece arrangement of Chung et al in attempt to improve the single-piece arrangement of modified Ref1, as a person with ordinary skill has good reason to pursue the known options within his or her

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technical grasp since the pedestal shield is either permanently attached to the pedestal (i.e. single-piece) or removable (i.e. two-piece).

With respect to claim 41, modified Ref1 further discloses in fig. 5 the second portion of the sidewall shield [60] includes a first subportion extending horizontally inward of the chamber, a second subportion extending vertically downward from said first subportion, and a third subportion extending horizontally inward from said second subportion , wherein the second arcuate portion extends from said third subportion. The cropped figure below of fig. 5 serves to further clarify the subportions.



With respect to claim 42, modified Ref1 further discloses in fig. 5 the first arcuate portion overlapping the second arcuate portion, where the overlap prevents deposition material from depositing onto sides and bottom of the chamber (col. 5, lines 50-67; col. 6, lines 1-15), where it is expected that the overlap also prevents primary and secondary gas scatter ray transmission. See MPEP 2112.01, Section I. If not, it must be due to a structural claim requirement not currently present.

With respect to claim 44, modified Ref1 further discloses in fig. 5 the pedestal [80] and pedestal shield is in the loading (i.e. lowered) position to permit a wafer (i.e. substrate) to be horizontally loaded onto said pedestal [80] via slit valve-controlled opening in chamber wall (col. 5, lines 20-49).

With respect to claims 45-47, the combination of the reference Ref2 teaching a removable deposition shield assembly [550] for a sputtering chamber, where said deposition shield assembly [550] comprises a removable shield ring [20] resting and secured directly on a removable deposition (i.e. pedestal isolator) ring [522] where said deposition ring [522] is attached to a pedestal [504] (abstract; fig. 6), with the advantage of using the deposition ring as preventing deposition on the chamber and hardware outside the processing region and facilitating replacement of the deposition ring due to built-up deposition material (abstract; col. 7, lines 28-35), combined with Chung et al teaching a removable pedestal shield attached to an end portion of a pedestal via a mechanical connection with the reference Ref2 teaching a removable pedestal shield resting and secured on a deposition ring on an end portion of a pedestal yields a removable pedestal shield removable attached and secured to an end portion that is a deposition (i.e. pedestal isolating) ring via a mechanical connection (col. 6, lines 34-64).

#### ***Response to Arguments***

##### **Claim Objections**

5. Applicant has cancelled the objected claim; the objection is moot.

103 Rejections

6. Applicant's arguments with respect to claims 38-47 have been considered but are moot in view of the ground(s) of rejection due to the new claims which have been addressed in the rejections above.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1723

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1723